

CLAIMS

1 1. A method of distillation, especially of ethanol from a mash, in which feed is
2 supplied to a first distillation column (stripper), and a distillate of the first distillation column is
3 fed into a second distillation column (rectifying column), characterized in that, in a first and/or
4 last process step, the feed (1) and/or a distillate (7) of the second distillation column (14) is
5 purified by a membrane separation process.

1 2. The method in accordance with claim 1, characterized in that the membrane
2 separation process is a membrane process.

1 3. The method in accordance with one or more of the preceding claims, characterized
2 in that the membrane process is a dynamic crossflow membrane filtration process.

1 4. The method in accordance with one or more of the preceding claims, characterized
2 in that a permeate (3) of the membrane separation process of the feed (1) is fed into the second
3 distillation column (14).

1 5. The method in accordance with one or more of the preceding claims, characterized
2 in that a retentate (2) of the membrane separation process of the feed (1) is fed into the first
3 distillation column (13).

1 6. The method in accordance with one or more of the preceding claims, characterized
2 in that the permeate (3) of the membrane separation process of the feed (1) is fed into the
3 second distillation column (14) as a mixture with the distillate (4) of the first distillation
4 column (13).

1 7. The method in accordance with one or more of claims 1 to 5, characterized in that
2 the permeate of the membrane separation process of the feed and the distillate of the first
3 distillation column are each fed separately to the second distillation column.

1 8. The method in accordance with one or more of the preceding claims, characterized
2 in that the mixture of the permeate and the distillate of the first distillation column that is fed
3 into the second distillation column or the separately supplied permeate and/or the distillate of
4 the first distillation column is maintained in the liquid state at the boiling point.

1 9. The method in accordance with one or more of the preceding claims, characterized
2 in that the quantitative ratio of the retentate (3) to the permeate (2) of the membrane separation
3 process of the feed (1) is between 1 and 8.

1 10. The method in accordance with one or more of the preceding claims, characterized
2 in that the water fraction of the permeate (3) of the membrane separation process of the feed
3 (1) remains in the liquid phase in the second distillation column (14).

1 11. The method in accordance with one or more of the preceding claims, characterized
2 in that the distillate (7) of the second distillation column (14) has an ethanol concentration of
3 75-95 wt. %.

1 12. The method in accordance with one or more of the preceding claims, characterized
2 in that the distillate (7) of the second distillation column (14) is fed into a group (17) of
3 parallel-connected membrane modules (18-20).

1 13. The method in accordance with one or more of the preceding claims, characterized
2 in that the distillate of the second distillation column (46) is fed into the membrane modules
3 (48-50) through a superheater (51).

1 14. The method in accordance with one or more of the preceding claims, characterized
2 in that a portion of a retentate (9) of the membrane modules (18-20) that constitutes the final
3 product is returned to each of the membrane modules (20) as a flushing stream of the permeate
4 side, and after it has passed through, it is returned, together with the permeate that forms, as a
5 feed stream (10) to the second distillation column (14).

1 15. The method in accordance with one or more of the preceding claims, characterized
2 in that the permeate (10) of the membrane modules (18-20) is preheated by the heat of the
3 bottom product (8) removed from the second distillation column (14).

1 16. The method in accordance with one or more of the preceding claims, characterized
2 in that the heat of the final product (9) and/or a bottom product (38) of the second distillation
3 column (46) is utilized to preheat the retentate (2, 32) of the membrane separation process of
4 the feed (1, 31).

1 17. The method in accordance with one or more of the preceding claims, characterized
2 in that the feed inlet (56) of the second distillation column (46) is equipped with a heat
3 exchanger.

1 18. The method in accordance with one or more of the preceding claims, characterized

2 in that the second distillation column is formed by two distillation columns that are separated
3 from each other.

1 19. The method in accordance with one or more of the preceding claims, characterized
2 in that the distillate of the second distillation column (46) is fed into the group (47) of
3 membrane modules through a superheater (51).